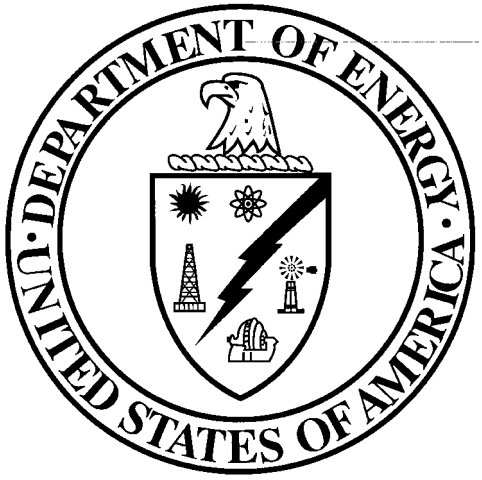
U.S. DEPARTMENT OF ENERGY
DEPARTMENT-WIDE
FUNCTIONAL AREA QUALIFICATION STANDARD

INDUSTRIAL HYGIENE QUALIFICATION STANDARD

Defense Nuclear Facilities Technical Personnel



U.S. Department of Energy
Washington, D.C. 20585

May 1995

Approval and Concurrence

The Assistant Secretary for Environment, Safety, and Health is the Management Sponsor for the Department-wide Industrial Hygiene Functional Area Qualification Standard. The Management Sponsor is responsible for reviewing the Qualification Standard to ensure that the technical content is accurate and adequate for Department-wide application. The Management Sponsor, in coordination with the Human Resources organization, is also responsible for ensuring that the Qualification Standard is maintained current. Concurrence with this Qualification Standard by the Assistant Secretary for Environment, Safety, and Health is indicated by the signature below.

The Technical Personnel Program Coordinator (TPPC) is responsible for coordinating the consistent development and implementation of the Technical Qualification Program throughout the Department of Energy. Concurrence with this Qualification Standard by the Technical Personnel Program Coordinator is indicated by the signature below.

The Technical Excellence Executive Committee (TEEC) consists of senior Department of Energy managers. This Committee is responsible for reviewing and approving the Qualification Standard for Department-wide application. Approval of this Qualification Standard by the Technical Excellence Executive Committee is indicated by the signature below.

NOTE: The signatures below reflect concurrence and approval of this Qualification Standard for interim implementation. Final concurrence and approval will occur in December 1995, pending comments received based upon implementation.

CONCURRENCE:

Assistant Secretary for Environment, Safety, and Health	Technical Personnel Program Coordinator

APPROVAL:

Chairman
Technical Excellence Executive Committee

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U.S. DEPARTMENT OF ENERGY
FUNCTIONAL AREA QUALIFICATION STANDARD

FUNCTIONAL AREA

Industrial Hygiene

PURPOSE

The Technical Qualification Program is divided into three levels of technical competence and qualification. The General Technical Base Qualification Standard establishes the base technical competence required of all Department of Energy defense nuclear facility technical personnel. The Functional Area Qualification Standards build on the requirements of the General Technical Base Qualification Standard and establish Department-wide functional competence requirements in each of the identified functional areas. Office/facility-specific qualification standards establish unique operational competency requirements at the Headquarters or Field element, site, or facility level.

The Industrial Hygiene Functional Area Qualification Standard establishes common functional area competency requirements for all Department of Energy industrial hygiene personnel who provide management oversight or direction impacting the safe operation of defense nuclear facilities. Satisfactory and documented completion of the competency requirements contained in this Standard ensures that technical employees possess the minimum requisite competence to fulfill their functional area duties and responsibilities. Additionally, these competency requirements provide the functional foundation to assure successful completion of the appropriate Office/facility-specific qualification standard.

APPLICABILITY

This Standard applies to all Department of Energy industrial hygiene technical personnel who provide management direction or oversight impacting the safe operation of defense nuclear facilities. Personnel designated by Headquarters or Field element line management as participants in the Technical Qualification Program are required to satisfy the competency requirements of this Standard as defined in DOE Order 3410.

IMPLEMENTATION REQUIREMENTS

The competencies contained in the Standard are divided into the following four categories:

1. General Technical
2. Regulatory
3. Administrative
4. Management, Assessment, and Oversight

Each of the categories is defined by one or more competency statements indicated by bold print. The competency statements define the expected knowledge and/or skill that an individual must possess and are requirements unless exempt by the process outlined in DOE Order 3410. Each

of the competency statements is further explained by a listing of supporting knowledge and/or skill statements. The supporting knowledge and/or skill statements are not requirements and do not necessarily have to be fulfilled to meet the intent of the competency.

The competencies identify a familiarity level, working level, or an expert level of knowledge; or they require the individual to demonstrate the ability to perform a task or activity. These levels are defined as follows:

Familiarity level is defined as basic knowledge of or exposure to the subject or process adequate to discuss the subject or process with individuals of greater knowledge.

Working level is defined as the knowledge required to monitor and assess operations/activities, to apply standards of acceptable performance, and to reference appropriate materials and/or expert advice as required to ensure the safety of Departmental activities.

Expert level is defined as a comprehensive, intensive knowledge of the subject or process sufficient to provide advice in the absence of procedural guidance.

Demonstrate the ability is defined as the actual performance of a task or activity in accordance with policy, procedures, guidelines, and/or accepted industry or Departmental practices.

Headquarters and Field elements shall establish a program and process to ensure that all defense nuclear facility technical personnel required to participate in the Technical Qualification Program meet the competency requirements contained in this Standard. Documentation of the completion of the requirements of this Standard shall be included in the employee's training and qualification record.

In select cases, it may be necessary to exempt an individual from completing one or more of the competencies in this Functional Area Qualification Standard. Exemptions from individual competencies shall be justified and documented in accordance with DOE Order 3410. Exemptions shall be requested by the individual's immediate supervisor, and approved one level above the individual's immediate supervisor.

Equivalencies may be granted for individual competencies based upon an objective evaluation of the employee's prior education, experience, and/or training. Documentation of equivalencies shall indicate how the competency requirements have been met. The supporting knowledge and/or skill statements may be considered when evaluating an individual's ability with respect to each competency requirement.

Training activities shall be provided to employees in the Technical Qualification Program who do not meet the applicable competencies contained in the qualification standard. Departmental training will be based upon supporting knowledge and/or skill statements similar to the ones listed for each of the competency statements. Headquarters and Field elements should use the supporting knowledge and/or skill statements as a basis for evaluating the content of any training courses used to provide individuals with the requisite knowledge and/or skill required to meet the qualification standard competency statements.

DUTIES AND RESPONSIBILITIES

The following are duties and responsibilities normally expected of defense nuclear facility technical personnel assigned to the industrial hygiene fuctional area:

A. Promote the integration of industrial hygiene requirements with the site infrastructure including strategic plans, funding plans, prioritization methodology, integrated work control programs, and other related technical disciplines such as occupational medicine, radiological protection, emergency preparedness, etc.

B. Evaluate the adequacy and effectiveness of Federal and contractor industrial hygiene programs to ensure program compliance with Department Orders, standards, guides; Federal regulations, statutes, codes; and applicable state and/or local regulations, statutes, codes; and applicable state and/or local regulations.

C. Monitor and assess contractor performance in the control of the work place hazards and the promotion of worker safety and health in all aspects of contractor operations.

D. Conduct investigations of occupational illnesses, fatalities resulting from occupational exposures to hazardous materials, and employee industrial hygiene concerns and prepare the corresponding reports(s).

E. Provide oversight of industrial hygiene programs and their implementation.

F. Serve as a technical point-of-contact, and/or subject matter expert for Departmental industrial hygiene activities.

G. Evaluate Federal employee health and safety programs and recommend appropriate measures to anticipate, recognize, evaluate, control or eliminate work place hazards.

H. Represent the Department at meetings, conferences, and committees involving technical, policy, and other matters pertinent to industrial hygiene and coordinate industrial hygiene programs with other Federal agencies.

I. Provide direction to other Federal employees and support contractors assigned to special project and Secretarial initiatives.

J. Assess the effectiveness of contractor industrial hygiene programs that anticipate, recognize, evaluate, and control worker exposure to adverse effects of chemical, biological, ergonomic, and physical hazards.

K. Provide technical assistance in the development of industrial hygiene training and awareness to ensure the adequacy and effectiveness of worker and public health programs.

L. Review and interpret occupational health standards, regulatory requirements, and criteria and, provide guidance or direction to Departmental management, Management and Operating contractors and employees.

M. Respond to Congressional and public inquiries through appropriate channels.

Additional duties and responsibilities specific to the site, the facility, the operational activities, and/or the involved organizations shall be contained in the facility-specific qualification standard(s).

BACKGROUND AND EXPERIENCE

The U. S. Office of Personnel Management's Qualification Standards Handbook establishes minimum education, training, experience, or other relevant requirements applicable to a particular occupational series/grade level, as well as alternatives to meeting specified requirements. The Industrial Hygienists position is classified by OPM as Occupational Series 690. Industrial hygiene personnel must meet the requirements for Occupational Series 690, but need not be classified as an industrial hygienist to fulfil this requirement.

The preferred education and experience for industrial hygiene personnel is:

1. Education:

   Degree: Industrial hygiene; or a branch of engineering, physical science, or life science that included 12 semester hours in chemistry, including organic chemistry, and 18 additional semester hours of courses in any combination of chemistry, physics, engineering, health physics, environmental health, biostatistics, biology, physiology, toxicology, epidemiology, or industrial hygiene. Courses in the history or teaching of chemistry are not acceptable.

   Non-Degree: Combination of education and experience-at least 12 semester hours of course work in chemistry, including organic chemistry, and 18 additional semester hours as specified in the degree requirements above, plus appropriate experience as stated below.

2. Experience:

   In addition to meeting the basic requirements described by OPM in the Occupational Series 690 (Industrial Hygiene), Department of Energy industrial hygiene personnel selected to participate in the Technical Qualification Program must have at least five years of specialized experience. Qualifying experience may have been obtained in field, laboratory, engineering, or other environments if the work provided a means of obtaining a professional knowledge of the theory and application of the principles of industrial hygiene and closely related sciences such as physics and engineering controls. Such work should have involved experience in all of the following areas: the acquisition of quantitative and qualitative data; the measurement of exposures for a variety of chemical, physical, and biological stresses; the analysis of the data acquired and the prediction of the probable effects of exposure on the health and well-being of worker; and the selection and recommendation of appropriate controls, including management, medical, engineering, education or training, and personal protective equipment.

   Specialized experience should be comprehensive in nature and scope; experience based solely on a narrowly focussed practice, such as asbestos monitoring or abatement, or hazardous waste operations, should not be used to satisfy the "specialized experience" requirement.

   Partial equivalency for the specialized experience requirement may be granted for those individuals with advanced degrees as follows:

   - One year of specialized experience may be substituted for those individuals who have a Masters level degree in Industrial Hygiene from a program accredited by the American Academy of Industrial Hygiene; or,

- Two years of specialized experience may be substituted for those individuals who have an earned Doctoral degree in Industrial Hygiene from an accredited university.

In addition to the education and experience stated above, certification by the American Board of Industrial Hygiene (ABIH) is highly recommended, and typically will serve as the basis for equivalency for the competencies in the "General Technical" section of this Standard.

REQUIRED COMPETENCIES

The competencies contained in this Standard are distinct from those competencies contained in the General Technical Base Qualification Standard. All industrial hygiene personnel selected to participate in the Technical Qualification Program must complete the competency requirements of the General Technical Base Qualification Standard prior to or in parallel with the completion of the competency requirements contained in this Standard. Each of the competency statements defines the level of expected knowledge and/or skill that an individual is required to possess to meet the intent of this Standard. The supporting knowledge and/or skill statements further describe the intent of the competency statements but are not requirements.

1. GENERAL TECHNICAL

Recognition of Health Stressors Associated with the Workplace

1.1 Industrial hygiene personnel shall demonstrate the ability to anticipate and recognize health stressors during the review of facility plans, designs, and operations prior to their implementation.

Supporting Knowledge and/or Skills

a. Discuss how a review of the following can be used to anticipate potential health stressors.

- Raw Materials
- Support materials
- Chemical reactions
- Chemical interactions
- Products
- By-products
- Waste products
- Equipment
- Operating procedures

b. Using data from an industrial hygiene assessment, determine the potential health effects resulting from exposure to the following:

- Irritants
- Sensitizers
- Corrosives
- Asphyxiants

c. Given an operation, evaluate the ergonomic hazards as they relate to the following:

- Work place design
- Interface between personnel and the work place
- Hazards associated with repetitive motion tasks
- Work/rest cycle
- Environment extremes

d. Describe how the following affect engineering technologies to control exposure:

- Design criteria
- Unit operations
- Design of control measures

e. Read and interpret relevant portions of design drawings, plans, and specifications.

f. Discuss the following types of health stressors found in the work place and the community and provide examples of each hazard.

- Chemical

- Biological
- Physical
- Ergonomic

g. Describe how the following sources of information can be used to assist in the anticipation of health stressors.

- Standards
- Regulations
- Other sources

h. Conduct a review of facility plans, design, and/or operations and identify potential health stressors.

1.2 Industrial hygiene personnel shall demonstrate a working level knowledge of study and observation methods used to identify and evaluate potential work place health stressors.

Supporting Knowledge and/or Skills

a. Discuss how the presence and use of existing control measures affect the evaluation of health stressors.

b. Describe how the following sensory indications may help with the identification of exposures.

- Odor
- Hearing
- Sight
- Touch

1.3 Industrial hygiene personnel shall demonstrate a working level knowledge of investigative techniques used to recognize exposures to health stressors which may be found in complaint reports and/or signs and symptoms of health decrement.

Supporting Knowledge and/or Skills

a. Discuss common signs and symptoms of health decrement.

b. Explain the following basic medical terminology associated with health decrement:

- Asbestosis
- Mesothelioma
- Pneumoconiosis
- Dermatitis
- Cumulative Trauma Disorder
- Chronic Beryllium Disease

c. Discuss the following basic epidemiological study methodologies and give examples of how each is used:

- Retrospective

- Prospective
- Case control
- Cohort

d. Using a complaint report, identify potential health stressors to be investigated.

e. Discuss the investigative techniques used to evaluate health and safety complaints.

1.4 Industrial hygiene personnel shall demonstrate a working level knowledge of how priorities are set by recording, organizing, and analyzing data.

Supporting Knowledge and/or Skills.

a. Discuss how "high risk" activities are prioritized.

b. Discuss the interpretation of statistical and non-statistical data in the evaluation of health and safety hazards.

c. Discuss how the cost of "control measures" effect the prioritization of hazards.

d. Describe the factors involved in the decision making process as they relate to the prioritization of hazards.

e. Discuss how available resources (personnel, money, equipment, etc.) affect the prioritization of hazards.

Evaluation of Health Stressors Associated with the Workplace

1.5 Industrial hygiene personnel shall demonstrate a working level knowledge of data collection plans used to collect environmental data which accurately reflects exposure conditions.

Supporting Knowledge and/or Skills

a. Discuss how the following factors may affect the sampling strategy:

- Representativeness of operations during sampling
- Environmental control methods in use
- Sample handling
- Data recording and management
- Chain of custody
- Statistical significance
- Exposure criteria and limits

b. Discuss how the following elements are used when developing a sampling strategy.

- Investigative design
- Duration
- Time requirements
- Need and procedures for bulk samples
- Routes of entry of harmful substances
- Job responsibility

- Number and composition of work force
- Number and type of operations and work schedules
- Plant layout

c. Describe how the safety of personnel conducting sampling and those being sampled is incorporated into the sampling plan or strategy.

d. Discuss privacy as it relates to record keeping and removal of records.

e. Discuss informed consent as it relates to taking samples (biological, etc.).

f. Discuss how the at-risk population affects the sampling strategy.

g. Describe how bioassay results are used by industrial hygiene personnel to evaluate exposures.

1.6 Industrial hygiene personnel shall demonstrate a working level knowledge of sampling techniques.

Supporting Knowledge and/or Skills

a. Describe how investigative techniques are used to determine sampling techniques.

b. Describe the significance of instrument calibration and operation, and data collection methods during sampling.

c. Discuss conditions which could require adjustments to the sampling plan to meet changing conditions.

d. Describe how multiple exposures affect sampling techniques.

e. Describe the factors (concentration, duration, frequency, etc.) that determine the adequacy of samples.

f. Describe how environmental factors (wind, rain, temperature extremes, etc.) affect the need for further sampling.

1.7 Industrial hygiene personnel shall demonstrate a working level knowledge of sample analysis, including the use of appropriate laboratory techniques.

Supporting Knowledge and/or Skills

a. Describe the following:

- Selection of proper analytical instruments/techniques
- Sensitivity/specificity of the analytical technique
- Precision versus accuracy
- Instrument bias
- Interferences in sampling
- Principles of instrument operation

b. Discuss laboratory data recording requirements.

c. Discuss the fundamentals of operating analytical equipment including zeroing and the use of standards.

d. Discuss the following laboratory concerns and their effect on sample analysis.

- Quality assurance
- Chain of custody (samples and results)
- Physical security of samples
- Personnel safety
- Equipment maintenance
- Laboratory management

1.8 Industrial hygiene personnel shall demonstrate a working level knowledge of the analysis and interpretation of sample results.

Supporting Knowledge and/or Skills

a. Discuss how the following are used in the analysis of sampling results:

- Mathematical and statistical computations
- Units and conversions

b. Discuss how the following can affect the interpretation of sampling results:

- Deductive/inductive reasoning
- Environmental conditions during sampling
- Instrument limitations
- Selection of techniques
- Trend analysis
- Need for additional data

c. Discuss how the following affect the significance of exposures.

- Selection of exposure criteria (action levels, etc.)
- Individual susceptibility to identified hazards
- Affect of other non-occupational exposures
- The affect of multiple exposures
- The impact of biological sampling results
- Make-up of worker population

d. Discuss the role standards, guidelines, and legal requirements have on analyzing and interpreting results.

Control of Health Stressors Associated with the Workplace

1.9 Industrial hygiene personnel shall demonstrate a working level knowledge of the methods used to educate people about protecting themselves, others, and the environment from health and environmental stressors.

Supporting Knowledge and/or Skills

a. Discuss how the following training elements are used to produce an effective presentation of health and environmental health stressors.

- Developing and organizing education materials
- Identifying resource materials
- Regulatory training requirements

b. Discuss the importance of including the following considerations in workers training on health and environmental stressors.

- Potential hazards for types of jobs and their control
- Interpreting and explaining material safety data sheets (MSDS) and other information materials.
- Work place processes and operations
- Purpose and operation of controls
- Job descriptions and procedures
- Communicating seriousness of potential hazards
- Use and maintenance of personal protective equipment
- Personal hygiene programs and facilities

c. Provide examples of the following and explain why these topics should be included in educational material on health stressors.

- Mass psychogenic response
- Responses in the event of elevated exposure
- Warning signs and symptoms of exposure

d. Explain the importance of including emergency response procedures in worker training sessions.

e. Identify the potential hazards associated with stresses in the home and environment which are related to work stress and should be covered in educational material.

1.10 Industrial hygiene personnel shall demonstrate a working level knowledge of personnel protective equipment (PPE) and the programs used to control exposures within acceptable levels.

Supporting Knowledge and/or Skills

a. Discuss the selection, use, maintenance, limitations, and capabilities of respiratory equipment.

b. Describe the major elements of the hearing conservation program.

c. Discuss personnel limitations in the use of personal protective equipment.

d. Discuss how codes, regulations, standards, and certification procedures affect the use of personal protective equipment.

e. Discuss matching personal protective equipment to the type of exposure.

f. Discuss how the properties of absorption, adsorption, and filtration mechanisms (respiratory protection) affect the selection of personal protective equipment.

g. Discuss matching protective clothing to exposure conditions.

h. Discuss how to recognize when personal protective equipment is an acceptable and appropriate alternative to other control mechanisms.

i. Discuss how to recognize when personal protective equipment is a necessary companion to other control measures

1.11 Industrial hygiene personnel shall demonstrate a working level knowledge of the design of engineering measures to control exposure.

Supporting Knowledge and/or Skills

a. Discuss basic design principles for heating, ventilation, and air conditioning (HVAC) systems including the following:

- Local exhaust ventilation
- Dilution ventilation
- Air recirculation
- Make-up air supply
- Energy balances

b. Describe the design principles and performance of air cleaners and explain the roles they play in minimizing worker exposure to chemicals and biological hazards.

c. Discuss the major regulations and standards governing ventilation systems.

d. Describe the following environmental factors:

- Atmospheric dispersion modeling
- Control of hypo- and hyper-baric conditions
- Psychrometry

e. Discuss the principles of isolation and enclosure as they relate to the following:

- Noise
- Air contaminants
- Radiation
- Hazardous waste

f. Discuss the economic feasibility of the following:

- Engineering Controls (including process change and substitution)
- Administrative Controls
- Personnel protective equipment (PPE)

g. Discuss the basic design principles used to control vibration and noise.

h. Describe the engineering principles used in controlling the following forms of radiation:

- Non-ionizing
- Ionizing

i. Discuss the control of flammable and combustible gases and vapors.

j. Discuss the means by which ergonomic stressors are controlled.

k. Describe how to evaluate the effectiveness of engineering measures used to control biological hazards.

l. Discuss the engineering measures used to control heat stress.

m. Describe the control features (backflow prevention, etc.) of potable water supply distribution.

n. Discuss the importance of engineering controls as they relate to sanitation of food service facilities and equipment.

1.12 Industrial hygiene personnel shall demonstrate a working level knowledge of the design of administrative measures to control exposure.

Supporting Knowledge and/or Skills

a. Discuss how the following measures contribute to effective exposure control:

- Applicability of medical monitoring to exposure
- Medical removal protection for sensitive workers
- Genetic screening
- Need for medical controls (physical examination, diagnostic testing, etc.)

b. Describe how application of the following administrative measures affect exposure control:

- Procedural modifications (work practices)
- Operations and scheduling
- Standard operating procedures
- Development of rules, standards, and procedures

c. Describe an acceptable application of the following administrative measures used to control exposure:

- Reduction of exposure time
- Control of ionizing and non-ionizing radiation
- Work/rest regimen for heat stress control

d. Discuss how the following relate to the administrative control of exposure:

- Personal hygiene practices

- Promoting and implementing good housekeeping practices
- Behavioral characteristics of workers and their influence on job assignments

1.13 Industrial hygiene personnel shall demonstrate a working level knowledge of the methods used to communicate control action recommendations.

Supporting Knowledge and/or Skills

a. Describe how to prepare a technical report.

b. Discuss major record-keeping requirements.

c. Discuss how to describe and recommend preferred control measures, alternatives, and/or interim control measures.

d. Discuss development of a schedule for the implementation of control measures.

1.14 Industrial hygiene personnel shall demonstrate the ability to verify the effectiveness of control measures and/or control system performance.

Supporting Knowledge and/or Skills

a. Discuss how the following are used to verify the effectiveness of control measures:

- Instrument calibration and operation
- Data collection
- Adjusting sampling plan to meet conditions
- Applying investigative techniques
- Recording multiple exposures
- Adequacy of samples

b. Compare obtained results to expected results and discuss their significance.

c. Discuss the use, capabilities, and limitations of ventilation equipment.

d. Discuss stack sampling

e. Discuss how employee feedback may be used to verify control measure effectiveness.

f. Discuss how factors such as hazard potential, process change, equipment life, etc., can be used in determining the schedule for re-evaluation of control measures.

g. Conduct an evaluation of planned and existing control measures and determine their effectiveness to ensure personnel and/or environmental protection.

Management of Industrial Hygiene Programs

1.15 Industrial hygiene personnel shall demonstrate a working level knowledge of Industrial Hygiene programs.

Supporting Knowledge and/or Skills

a. Describe the major components of sound industrial hygiene programs.

b. Discuss management of industrial hygiene resources.

c. Discuss the impact of legal requirements.

d. Discuss the implications of noncompliance.

e. Discuss target populations.

f. Discuss different assessment techniques.

Professional/Ethical Issues

1.16 Industrial hygiene personnel shall demonstrate a working level knowledge of the standards of professional behavior required to maintain professional conduct consistent with published ethical guidelines for the profession.

Supporting Knowledge and/or Skills

a. Discuss the American Industrial Hygiene Association (AIHA) Code of Ethics.

b. Discuss the Adverse Actions section of the American Board of Industrial Hygiene (ABIH) Bulletin, current edition.

c. Discuss legal issues affecting the practice of Industrial Hygiene including confidentiality of medical data and restraint of trade (antitrust).

d. Discuss ethical behavior in scientific data gathering and reporting.

e. Discuss personal ethical behavior including:

- Misrepresentation of qualifications and credentials
- Conflict of interest

2. REGULATORY

NOTE: When Department of Energy (DOE) directives are referenced in the qualification standard, the most recent revision should be used.

2.1 Industrial hygiene personnel shall demonstrate the ability to evaluate the adequacy of local compliance with the following document sections:

29 CFR 1910, Occupational Safety and Health Standards such as the following:

- 1910.20 - Access to Employee Exposure and Medical Records
- 1910.120 - Hazardous Waste Operations and Emergency Response
- 1910.146 - Permit-Required Confined Spaces
- Subpart G - Occupational Health and Emergency Response
- Subpart H - Hazardous Materials
- Subpart I - Personal Protective Equipment
- Subpart J - General Environmental Controls
- Subpart K - Medical and First Aid
- Subpart Q - Welding, Cutting, and Brazing
- Subpart Z - Hazardous Substances

29 CFR 1926, Safety and Health Standards such as the following:

- Subpart D - Occupational Health and Environment Control
- Subpart E - Personal Protective and Life Saving Equipment
- Subpart H - Material Handling, Storage, Use, and Disposal
- Subpart J - Welding and Cutting
- Subpart Y - Record-keeping
- Appendix A&B to Subpart Y - Examples of conditions which may restrict or limit exposure to hyperbaric conditions and guidelines for scientific diving
- Subpart Z - Toxic and Hazardous Substances

Industrial hygiene-related technical standards such as the following:

- 40 CFR 763 - Asbestos
- ANSI Z88.2 - Practices for Respiratory Protection
- ANSI Z88.6 - Respiratory Protection, Respirator Use, and Physical Qualifications for Personnel
- ANSI Z136.1 - Safe use of Lasers
- ANSI Z117.1 - Safety Requirements for Working in Tanks and Other Confined Spaces
- ANSI Z358.1 - Emergency Eyewash and Shower Equipment
- ANSI C95.1 - Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100GHz
- ACGIH TLV Booklet - American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.

Supporting Knowledge and/or Skills

a. Describe the purpose, scope, and application of the requirements detailed in the listed document sections.

b. Discuss the process by which Department line management determines an appropriate level of coverage by industrial hygienists. Include in this discussion factors that may influence the level of coverage.

c. Discuss what constitutes acceptable contractor work performance consistent with the requirements of the above regulations and technical standards.

d. Using selected sections from 29 CFR 1910, 29 CFR 1926, and technical standards, prepare an action plan which adequately outlines interviews and observations, and details documents to review during an evaluation of contractor compliance against the requirements of the selected sections.

e. Using an appropriate level of coverage, evaluate contractor compliance with the requirements of selected sections of 29 CFR 1910, 29 CFR 1926, and technical standards. During this evaluation, demonstrate the ability to properly conduct interviews, observations, and document reviews.

f. Given data from an evaluation, analyze the results of the evaluation to determine contractor compliance or noncompliance with the requirements.

g. Given the results from an analysis of contractor compliance or noncompliance, document the results to contractor and Department line management.

2.2 Industrial hygiene personnel shall demonstrate the ability to determine the adequacy of local compliance with the industrial hygiene-related sections and/or requirements of Department of Energy (DOE) Orders such as the following:

- DOE Order 3790.1B, Federal Employee Occupational Safety and Health Program
- DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information
- DOE Order 5480.1B, Environment, Safety and Health Program for Department of Energy Operations
- DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards
- DOE Order 5480.8A, Contractor Occupational Medical Program
- DOE Order 5480.9A, Construction Project Safety and Health Management
- DOE Order 5480.10, Contractor Industrial Hygiene Program
- DOE Order 5480.19, Conduct of Operations Requirements for DOE Facilities
- DOE Order 5480.20A, Personnel Selection, Qualification, and Training Requirements for DOE Nuclear Facilities
- DOE Order 5480.22, Technical Safety Requirements
- DOE Order 5480.23, Nuclear Safety Analysis Reports
- DOE Order 5481.1B, Safety Analysis and Review System
- DOE Order 5482.1B, Environment, Safety, and Health Appraisal Program
- DOE Order 5483.1A, Occupational Safety and Health Program for DOE Contractor Employees at Government Owned Contractor Operated Facilities
- DOE Order 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements
- DOE Order 5500.3A, Planning and Preparedness for Operational Emergencies

<u>Supporting Knowledge and/or Skills</u>

a. Describe the purpose, scope, and application of the requirements detailed in the listed Orders with respect to industrial hygiene.

b. Discuss what constitutes acceptable contractor compliance/work performance consistent with the requirements of the above Orders.

c. Using an appropriate level of coverage, evaluate contractor compliance with the requirements of the selected Orders. During this evaluation, demonstrate the ability to properly conduct interviews, observations, and document reviews.

d. Given data from an evaluation, analyze the results of the evaluation to determine contractor compliance or noncompliance with the requirements.

e. Given the results from an analysis of contractor compliance or noncompliance, document the results and communicate them to contractor and Department line management.

3. ADMINISTRATIVE

3.1 Industrial hygiene personnel shall demonstrate a familiarity level knowledge of industrial hygiene-related data management requirements.

Supporting Knowledge and/or Skills

a. Describe the Department's organization and discuss the Department's procedures for communicating between Headquarters and Field elements.

b. Describe the Department's procedures and policy for communicating with state and local organizations, Occupational Safety and Health Administration (OSHA), and other regulatory agencies.

3.2 Industrial hygiene personnel shall demonstrate a familiarity level knowledge of the principle Departmental and external committees, agencies, and associations relating to the field of industrial hygiene.

Supporting Knowledge and/or Skills

a. Describe the purpose and significance of the following:

- Department of Energy Industrial Hygiene Coordinating Committee
- Department of Energy Environment, Safety, and Health Council
- American Industrial Hygiene Association (AIHA)
- American Conference of Governmental Industrial Hygienists (ACGIH)
- American Board of Industrial Hygiene (ABIH)
- American National Standards Institute (ANSI)
- Mine Safety and Health Administration (MSHA)
- Occupational Safety and Health Administration (OSHA)
- Environmental Protection Agency (EPA)
- National Institute of Occupational Safety and Health (NIOSH)

4. MANAGEMENT, ASSESSMENT AND OVERSIGHT

NOTE: When Department of Energy (DOE) directives are referenced in the qualification standard, the most recent revision should be used.

4.1 Industrial hygiene personnel shall demonstrate a working level knowledge of assessment techniques such as the planning and use of observations, interviews, and documentation reviews to assess industrial hygiene performance, report results of assessments, and follow up on actions taken as the result of assessments.

Supporting Knowledge and/or Skills

a. Describe the role of an industrial hygienist with respect to oversight of Department Government-Owned Contractor Operated (GOCO) facilities and operations.

b. Describe the assessment requirements and limitations associated with the interface with contractor employees.

c. Discuss the essential elements of a performance-based assessment including:

- Investigation
- Fact finding
- Exit briefing
- Documentation and reporting
- Follow-up
- Closure

d. Describe the following assessment techniques and the advantages and limitations of each method:

- Document review
- Observation
- Interview

e. Describe the action to be initiated/taken if the contractor challenges the assessment findings and explain how such challenges may be avoided.

4.2 Industrial hygiene personnel shall demonstrate the ability to conduct assessments, develop recommendations for corrective actions, communicate assessment results, and develop supporting reports/documentation.

Supporting Knowledge and/or Skills

a. Conduct compliance-based and performance-based assessments. Identify the differences in outcomes and the reasons for these differences.

b. Write an assessment appraisal report.

c. Based on an evaluation of contractor activities, develop corrective actions and recommendations, and communicate these to contractor management.

d. Participate in a formal meeting between cognizant Department management and senior contractor management to discuss the results of an industrial hygiene compliance/performance assessment.

4.3 Industrial hygiene personnel shall demonstrate the ability to trend and analyze industrial hygiene-related information.

Supporting Knowledge and/or Skills

a. Using the appropriate procedures, trend and analyze relevant facility operations information and discuss their relationship to industrial hygiene performance.

b. Using recognized industrial hygiene performance indicators, determine the type of assessment(s) that should be performed, and in what areas.

c. Identify and discuss the principal performance indicators that are normally used to review industrial hygiene program performance/effectiveness.

4.4 Industrial hygiene personnel shall demonstrate an expert level knowledge of the requirements and process for determining the appropriateness of variance requests and equivalencies relating to Department of Energy prescribed industrial hygiene requirements or standards.

Supporting Knowledge and/or Skills

a. Given a variance request, or an alternate compliance approach (equivalency), review, evaluate, and make recommendations for granting the request or, a judgement on the appropriateness of the equivalency.

b. Describe the factors that must be considered before recommending the granting of a variance or in judging the appropriateness of an equivalency.

c. Describe the Department's approval process for industrial hygiene variances.

4.5 Industrial hygiene personnel shall demonstrate the ability to apply recognized industrial hygiene evaluation criteria and methods to reduce the risk of occupational disease or illness.

Supporting Knowledge and/or Skills

a. Perform a facility/operation industrial hygiene compliance assessment that includes the following:

- Health hazard identification
- Health hazard exposure assessment
- Engineering control method(s) evaluation
- Personal protective equipment/program evaluation
- Work practice evaluation
- Record keeping and reporting procedures

b. Discuss the importance of management commitment and worker involvement and the criteria used to evaluate these program factors to the following:

- Deficiency resolution
- Self-assessment
- Issues management
- Conduct of operations
- Hazard identification and evaluation
- Hazard reporting and disposition of employee concerns
- Trending and analysis
- Procedures development
- Resource allocation (dollars, personnel, equipment)

c. Review a quality assurance program related to the industrial hygiene program and activities. Analyze the program for:

- Independent verification
- Sampling methods and chain of custody
- Laboratory accreditation
- Documentation
- Quality Assurance implementation plan/procedures

4.6 Industrial hygiene personnel shall demonstrate a working level knowledge of emergency preparedness and response operations including personnel training, qualifications, equipment, organizational interfaces, procedures and documentation.

Supporting Knowledge and/or Skills

a. Discuss industrial hygiene concerns/issues associated with providing emergency response operations for the following:

- Emergency medical response
- Toxic material emergencies (releases, spills, etc.)
- Fire emergencies
- Transportation accidents
- Rescue

b. Describe the industrial hygiene concerns/issues associated with providing personal protective equipment (PPE) and emergency equipment based on applicable exposure guides/limits (e.g., Emergency Response Planning Guidelines (ERPG), Short Term Exposure Limits (STEL), Immediately Dangerous to Life and Health (IDLH), Time Waited Average (TWA)).

c. Discuss roles and responsibilities, lines of authority, and communication as they relate to emergency response activities both internal and external to the Department.

d. Describe the industrial hygiene concerns/issues relating to the following procedures:

- Decontamination
- Confined space entry

e. Discuss the personnel training and qualification requirements for emergency response personnel.

4.7 Industrial hygiene personnel shall demonstrate a familiarity level knowledge of Department of Energy contract management and administration sufficient to appraise contractor organizations in the area of industrial hygiene.

Supporting Knowledge and/or Skills

a. Discuss the key elements of the contractual relationship between the Department and the contractor and the process for preparing cost estimates and budgets.

b. Describe the role of the industrial hygienist with respect to the evaluation of contractor industrial hygiene programs for the cost-plus award fee process.

c. Describe the responsibilities of an industrial hygienist associated with contractor compliance with the Price Anderson Amendments Act.

d. Using actual or hypothetical data for a industrial hygiene program, discuss the program's budget, schedule, appropriateness and impact on occupational health protection.

4.8 Industrial hygiene personnel shall demonstrate the ability to evaluate industrial hygiene training and personnel qualification programs.

Supporting Knowledge and/or Skills

a. Observe and evaluate two on-the-job health hazard training exercises for adequacy and adherence to recognized industry and local guidelines.

b. Review a set of contractor industrial hygiene training records for appropriateness, accuracy, and completeness.

4.9 Industrial hygiene personnel shall demonstrate the ability to independently assess contractor and/or Department of Energy compliance with the industrial hygiene-related requirements contained in the following Orders with respect to occupational health protection issues:

- **DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards**
- **DOE Order 5482.1B, Environment, Safety, and Health Appraisal Program**
- **DOE Order 5480.10, Contractor Industrial Hygiene Program**
- **DOE Order 3790.1A, Federal Employee Occupational Safety and Health Program**

Supporting Knowledge and/or Skills

a. Assess contractor and/or Department work activities in accordance with relevant programmatic responsibilities and requirements of the above Orders.

b. Given data from an industrial hygiene assessment, analyze results to determine compliance with applicable requirements of the above Orders.

c. Given the findings from an assessment of compliance or non-compliance, document the results and communicate results to the contractor and/or Department line management.

EVALUATION REQUIREMENTS

The following requirements shall be met to complete the Department-wide Industrial Hygiene Functional Area Qualification Standard. The evaluation process identified below serves as a measurement tool for assessing whether the participants have acquired the technical competencies outlined in this Standard.

1. Documented completion of the Department-wide General Technical Base Qualification Standard in accordance with the requirements contained in that standard.

2. Documented determination of the required education and experience requirements established by the Office of Personnel Management for Industrial Hygienists.

3. Documented completion of the competency requirements listed in this functional area qualification standard. Documentation of the successful completion of these competency requirements may be satisfied by a qualifying official using any of the following methods:

   - Documented evaluation of equivalencies
   - Written examination
   - Documented oral evaluation
   - Documented observation of performance

4. The following may be used to demonstrate equivalency of the competency requirements delineated in the General Technical section of this Standard when they are evaluated and documented using the equivalency process outlined in DOE Order 3410:

   - A Masters level degree in Industrial Hygiene from a program accredited by the American Academy of Industrial Hygiene, or
   - An earned Doctoral degree in Industrial Hygiene from an accredited university, or
   - An American Board of Industrial Hygiene (ABIH) certification (i.e., Certified Industrial Hygienist or CIH)

CONTINUING TRAINING AND PROFICIENCY REQUIREMENTS

Industrial hygiene personnel shall participate in an Office/facility/position-specific continuing training and qualification program that includes the following elements:

1. Technical education and/or training covering topics directly related to the duties and responsibilities of industrial hygiene personnel as determined by line management. This may include courses and/or training provided by:

   - Department of Energy
   - Other Government agencies
   - Outside vendors

   - Educational institutions
   - Professional conferences and meetings such as:

     - American Industrial Hygiene Conference and Exhibition
     - Professional Conference on Industrial Hygiene

- Department of Energy Annual Occupational Safety and Health Conference
- American Conference of Governmental Industrial Hygienists (ACGIH) or American Industrial Hygiene Association (AIHA) Technical Committees

2. Training covering topics that address identified deficiencies in the knowledge and/or skills of industrial hygiene personnel.

3. Training in areas added to the Industrial Hygiene Functional Area Qualification Standard since initial qualification.

4. Continuing training in areas such as the following:

   · Site/facility/position-specific topics such as changes to the facility, significant facility events
   · Industry events (including both Department of Energy and applicable commercial events)
   · Lessons learned

5. Specific continuing training requirements shall be documented in Individual Development Plans (IDPs).

6. Industrial hygienists must be actively engaged in responsible industrial hygiene related activities each year to maintain their qualification.